VR9500
REVOLUTION
Vibration Control System

Quick Start Guide

This guide is intended to help you get started quickly and is not intended to replace the Operator's Manual. For optimal system settings and troubleshooting, as well as safety precautions, please refer to the Help File or the User Manual.

VIBRATION RESEARCH

VR9500 REVOLUTION

Vibration Control System

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Thank you for purchasing a VR9500 Revolution vibration control system from Vibration Research Corporation. We appreciate your business! Vibration Research Corporation is continually upgrading the features and capabilities of our products. Please visit our website **www.vibrationresearch.com** regularly to download the latest available VibrationVIEW software for your VR9500 Revolution controller.

In the event you have questions regarding your system you can either contact the Vibration Research Corporation representative from whom your controller was purchased, or contact our product support staff directly at **support@vibrationresearch.com**. You may also call **616.669.3028** from 8am-5pm Eastern, Monday-Friday.

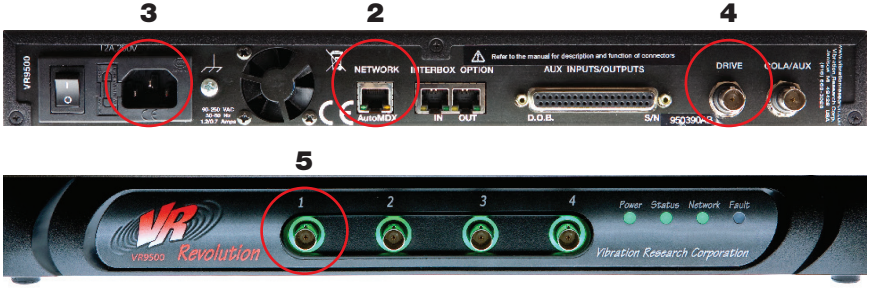
Watch our “Setting Up Your System” video

(click on the “Play Video Only” button for iPhone)

Setting up the hardware

Connecting the VR9500

1. Set up the computer in the conventional configuration, with power cables, mouse, keyboard, and monitor.
2. Connect the VR9500 network port to the dedicated network card in the computer using the included orange straight cable.
3. Connect the power cord to the VR9500. The power input will automatically switch for voltage 90 - 250VAC and 50/60 Hertz.
4. Connect the shaker amplifier's input to the Drive output connector on the rear of the VR9500.
5. Connect an accelerometer to channel 1 of the VR9500. Other accelerometers can be connected to channels 2, 3 and 4.



Connecting Multiple VR9500 Units

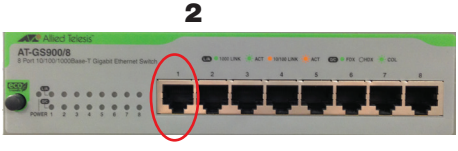
1. Two or more VR9500 units require a network switch.

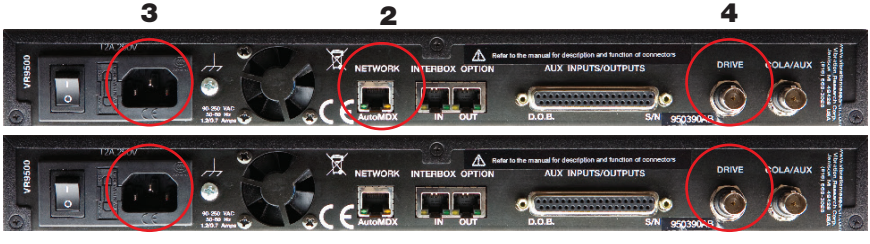
2. Connect the first VR9500 to port 1 on the switch. Additional VR9500's can be connected to port 2, 3, and 4 on the switch. Connect the computer to highest numbered port with the supplied cable.

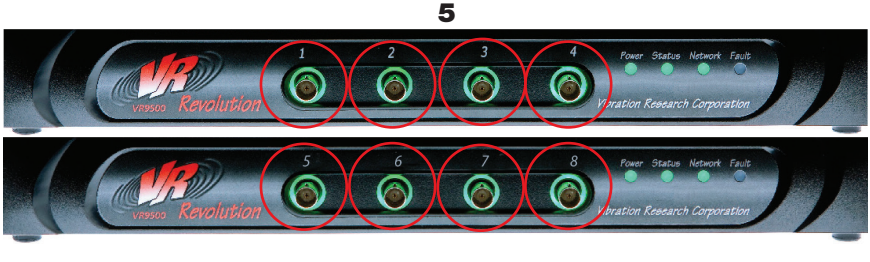
3. Connect the supplied VAC power cords to each of the VR9500's.

4. Connect the shaker amplifier's input to the Drive output connector on the first VR9500. For systems controlling two shakers simultaneously, connect the second shaker's amplifier input to the Drive output connector on the second VR9500.

5. Connect accelerometer channels 1-4 to channels 1-4 of the first VR9500, accelerometer channels 5-8 to channels 5-8 on the second VR9500, accelerometer channels 9-12 to channels 9-12 on the third VR9500 accelerometer and channels 13-16 to channels 13-16 on the fourth VR9500, etc. up to 128 channels.



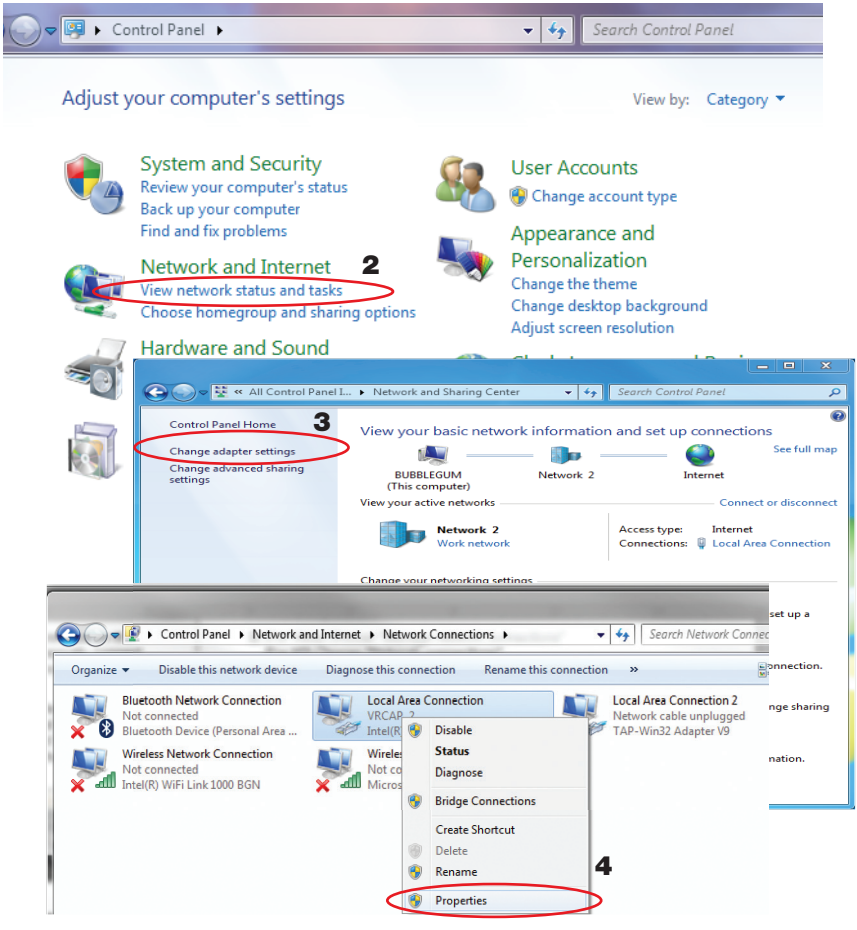




Establishing PC Communication

Configuring the VR9500

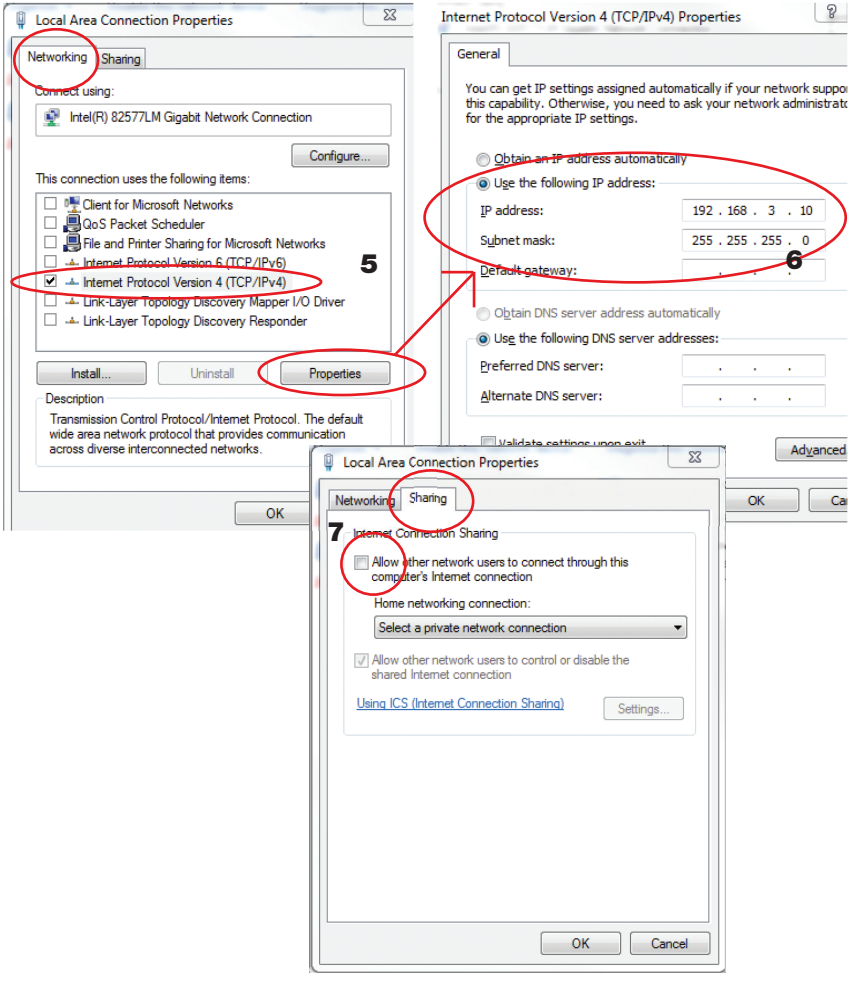
1. Set up the dedicated network card for VibrationVIEW. Select the network card dedicated to the VR9500 from Panel Home (“Start Button--> Control Panel).
2. Choose option “View network status and tasks”.
3. Choose option “Manage network connections” (Vista) -or-
   Choose option “Change adapter settings” (Windows 7)
4. Click on the network card attached to the VR9500 with the RIGHT mouse button and select “Properties”.



5. Disable all the options except Internet Protocol Version 4 (TCP/IPv4).

6. Assign address 192.168.3.10 and subnet mask 255.255.255.0 as shown in the Internet Protocol (TCP/IP) Properties dialog box. If multiple network cards are installed in the computer the IP address can be adjusted. Other recommended values are 192.168.2.10 and 192.168.4.10, although any Class C or Class D subnet will work. Click the OK button to return to the previous dialog.

7. Click the Sharing tab in the Properties dialog box. Make sure Internet Connection Sharing for this connection is unchecked (NOT enabled).

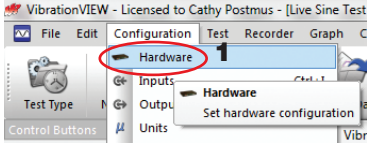

Local Area Connection Properties
Networking
Sharing
Intel(R) 82577LM Gigabit Network Connection
Configure...
This connection uses the following items:
Client for Microsoft Networks
QoS Packet Scheduler
File and Printer Sharing for Microsoft Networks
Internet Protocol Version 6 (TCP/IPv6)
Internet Protocol Version 4 (TCP/IPv4)
Link-Layer Topology Discovery Mapper I/O Driver
Link-Layer Topology Discovery Responder
5
Install...
Uninstall
Properties
Description
Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.
OK
Internet Protocol Version 4 (TCP/IPv4) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
192 . 168 . 3 . 10
Subnet mask:
255 . 255 . 255 . 0
Default gateway:
6
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced
OK
Local Area Connection Properties
Networking
Sharing
7
Internet Connection Sharing
Allow other network users to connect through this computer's Internet connection
Home networking connection:
Select a private network connection
Allow other network users to control or disable the shared Internet connection
Using ICS (Internet Connection Sharing)
Settings...
OK
Cancel

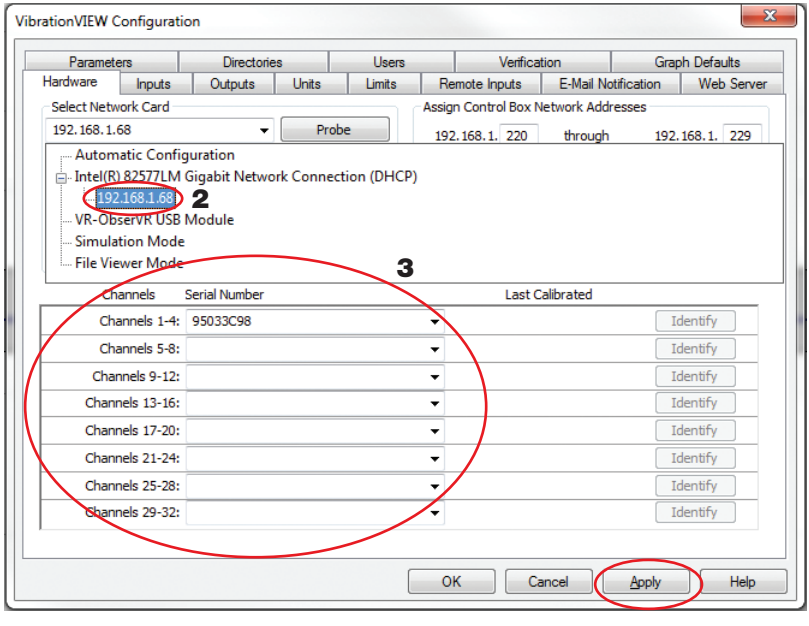
Connecting to VibrationVIEW

1. VibrationVIEW must be configured to use the appropriate network connection after the network is setup. Start VibrationVIEW by double-clicking the VibrationVIEW icon on the desktop. Select the configuration... Hardware menu command.

2. Select the network card previously configured. Typically this will be 192.168.3.10. Click the apply button.

3. Your VR9500 serial number will be added to the drop down menu for channels 1-4 when it initially connects to the computer. Select the appropriate VR9500 serial number to configure channels 1-4 and, optionally, channels 5-8, channels 9-12, and 13 through 128 (in blocks of 4 channels). The VR9500 control boxes are assigned addresses from the range listed in the Control Boxes Address parameters. This does not need to be changed.

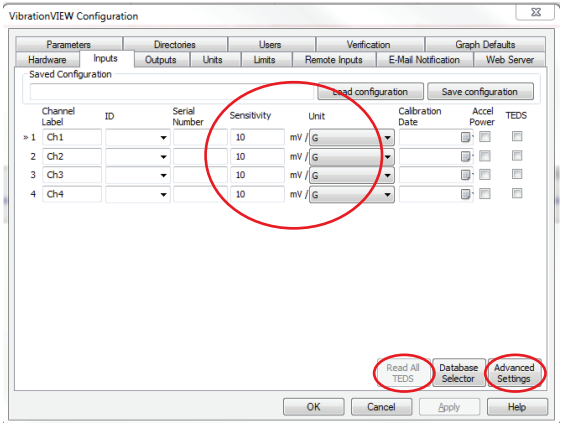




Input Configuration

Setting Sensitivities for Inputs

The inputs must be configured for each connected accelerometer. Each input can be configured as single ended, differential and optionally capacitor coupled. Single ended inputs can also provide a constant current source to power your accelerometers. Other types of accelerometers such as charge coupled accelerometers require external conditioning. Be sure to enter the proper conditioner calibration factor in the “Advanced Settings” option from the “Inputs” tab.



To view/edit more information on an accel click the “Advanced Settings” button. If the connected accelerometer has TEDS (Transducer Electronic Data Sheet) containing the calibration information, simply click the “TEDS” checkbox and the information will automatically be entered when you click “Read All TEDS”. When the appropriate values are entered, click the “OK” button. The new accelerometer sensitivity factors will take effect immediately.

Note: Be sure to check the “Accel Power” box if you want the VR9500 to provide the constant current source to your accel.

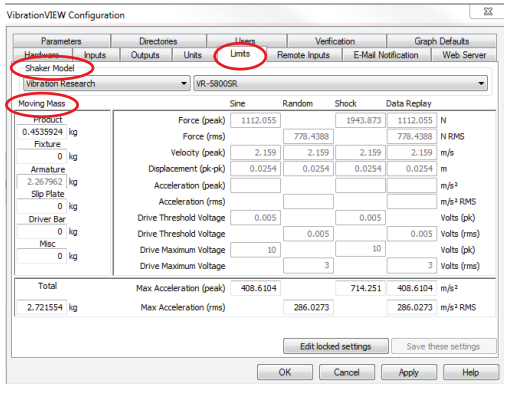
System Limits

Shaker Limits and Moving Mass

The controller checks the system specifications to determine if the shaker is able to perform the current test. The shaker force, velocity and displacement limit values only need to be entered once when the system is first configured. The fixture and product masses that are required to properly compute the acceleration limits of the shaker must be entered every time the fixture or product mass is changed.

To set the system limits, select the Configuration..System Limits menu command. In the dialog box, either select the shaker model matching your setup or select User Defined Limits to enter the specifications of your shaker system. These specifications should be listed in the manual for your shaker system.

Enter the Moving Mass for all the shaker parts on your system. If your system does not have one of the listed parts, enter zero for that item's mass. The sum of these mass values is used to calculate the maximum operating acceleration for your system using Newton's law:
Force = mass * acceleration

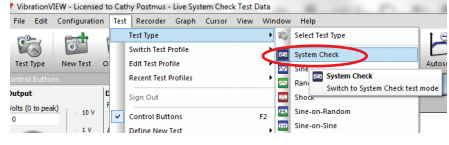


System Check

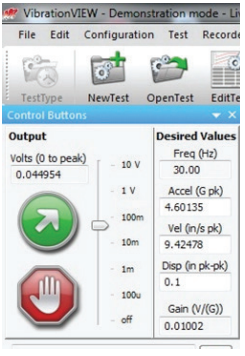
Verify Inputs and Outputs

To verify that the input and output levels and frequencies are correct, perform the following procedure:

1. Select the Test..Test Type..System Check menu command to switch the system into System Check mode.



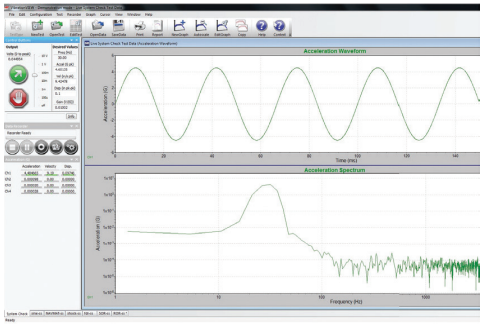
2. Select the Configuration..Inputs menu command. Verify that your accelerometer sensitivity and power source settings are configured appropriately. The constant current source is enabled in this dialog box. If you are using constant current accelerometers or a conditioner that requires a constant current source make sure the "Accel Power" is checked. Click the "OK" button.



3. For Electro Dynamic shakers, enter a frequency of 30 Hz and a displacement of 0.1 inches (peak-to-peak) in the System Check Control Center. These are the default values. For Servo Hydraulic shakers, set to 20 Hz and 0.05 inches (peak-to-peak).

4. Verify that the input levels are near zero (double right-click on the graph to auto scale).

5. Click the “Run” button. The output level should slowly ramp up until the shaker approaches a 0.1-inch peak-to-peak displacement (0.05 inches if using the Servo Hydraulic recommended set-up).



6. If the shaker does not move, click the “Stop” button to turn the output off. Verify that the Drive output connector from the VR9500 is connected to the shaker amplifier’s input, and that the amplifier is turned on (and gain is up) and that the amplifier output is connected to the shaker. Return to step 4.

7. If the shaker still does not move, connect the Drive output connector of the VR9500 to an oscilloscope or true RMS voltmeter, set the output voltage level to 0.5 volts (0-to-peak) and verify that you have a 0.5 volt (0-to-peak) amplitude reading (0.35 volts RMS). If the Drive output connector is not measuring 0.35 volts RMS, your system may require calibration.

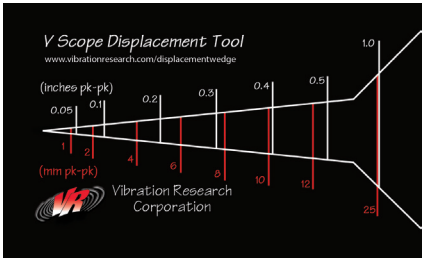
***If the shaker vibrates, but the input waveform remains flat, click the “Run” button a second time so that the text on the “Run” button is dark and the output stops ramping up. Check the accelerometer cables to verify that they have good connections and that the accelerometer conditioning equipment is turned on. If you are using the internal current source to power the accelerometer, verify that “Accel Power” on Configuration..Inputs dialog box is checked.

***If there still is no input signal, connect the conditioned accelerometer signal to an oscilloscope or voltmeter and verify that you see a voltage reading. If there is no reading, click the “Stop” button to turn the output off, replace the accelerometer cable, accelerometer and/or the accelerometer conditioning equipment with devices known to be working and return to step 4.

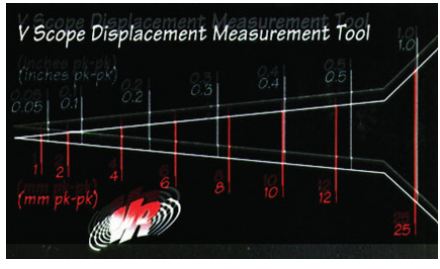
Note: most problems are due to bad cable connections.

8. Once you get both an output and an input signal, use a displacement measurement tool to verify that the shaker peak-to-peak displacement matches the value shown in the System Check Control Center. If it does not match, select the Configuration..Inputs menu command to verify that the accelerometer sensitivity settings match the calibrated values for the accelerometers you are using.

Note: To use the V Scope Displacement Measurement Tool – tape or hold firmly on shaker head so that it moves in the direction of vibration (see arrows). The lines will blur and intersect at the 0.1 inch mark on the measurement tool if the shaker is moving as directed above (0.05 for the servo hydraulic set-up). If the lines don't intersect there, check that your accelerometer sensitivities are set correctly (and power source on, if required).



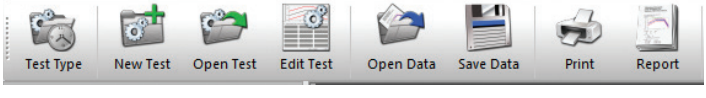
shaker still



shaker vibrating with 0.1" displacement

SineVIEW Test Setup

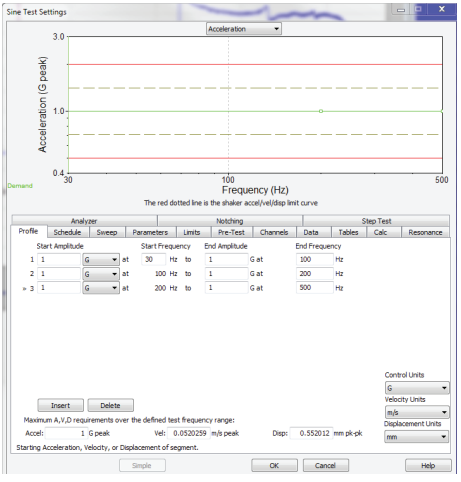
Entering a Sine Test



Click the New Test button and select "Sine" to begin defining a new Sine test. Simple Test Mode is enabled by default. To disable Simple Test mode, select the Configuration..Parameters menu option and uncheck "Define new tests as Quick Tests".

This will guide you through the following series of "Advanced" configuration dialog boxes. Default values will be supplied for all parameters. If you are unsure about a parameter, use the default value (click the "Help" button in the lower right corner of the Settings window for specific Help information). After all the values for each dialog tab are entered, click the next tab to advance to the next set of information for setting up the test.

1. Sine Profile - The amplitude and frequency breakpoints and the desired control parameters (acceleration, velocity or displacement) for the test are entered here. Use the scrollbar to scroll through the defined segments and the Insert/Delete buttons to add or remove segments. The small arrow next to the numbers on the left of the window indicates the current insertion/deletion point. A test may be composed of over 1000 segments.

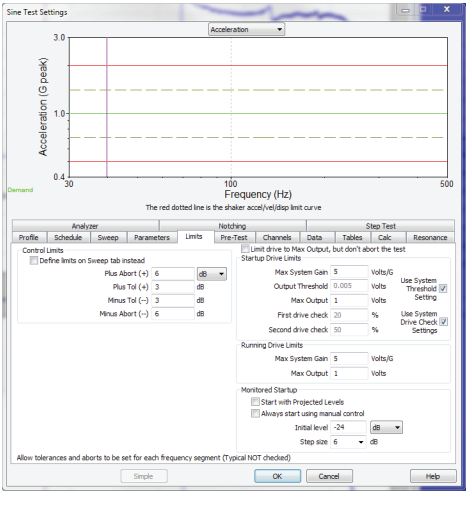


2. Sine Schedule - The duration of the test is entered here. Durations may be entered in time duration, number of sweeps or number of cycles. The test schedule is also used to schedule sweeps scaled to different amplitude levels and to select one or more fixed frequency tones.

3. Sine Sweep - The sweep rate is entered here. Enter the sweep rate and click the drop box to select the desired units.

4. Sine Parameters - The feedback control parameters for the test are entered here. For most tests, the parameters may be left at their default values. In some cases (such as when the control accelerometer sees a large resonance) these values will need to be tuned.

5. Sine Limits - The tolerance and abort limits for the test are entered here. The control tolerance and abort limits apply to the control signal. If monitoring channels are being used, enable the appropriate channels in the Sine Channels dialog box and enter the plus and minus abort limits for the monitor channel. All limits are measured in dB relative to the demand signal at the active frequency.

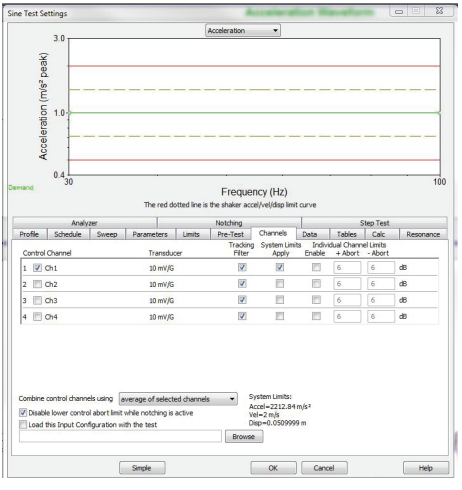


The tolerance lines are reference lines shown on the graphs (brown dashed lines) and are used to determine when the controller goes from “Starting” to “Run” mode when starting a test (Run button is Yellow during “Starting” and changes to Green when “Running”).

The Plus and Minus aborts are limits that, when exceeded, cause the test to abort. The control abort lines are shown on the graphs as solid red lines.

The maximum output voltage limits, both absolute (Max Output parameter) and relative to the measured acceleration level (Max System Gain parameter) are also entered here. These parameters are safety limits that will cause the test to abort when something goes wrong (for example, when an accelerometer cable comes loose.)

Refer to the “How to tune Sine controller parameters” section in the manual for more information on how to determine the appropriate Max Output and Max System Gain parameters for your test.



6. Sine Channels - The control channels for the test are selected here, as well as a way to combine the selected control channels and whether or not to use tracking filters for either the control channel or the monitor channel inputs.

7. Sine Data Storage - The directory into which the data from this test will be stored is selected here. Data can be automatically stored on a regular time interval, at the end of each level (levels are defined using the Schedule dialog box) and at the end of the test. Select the check boxes for your desired data storage times and enter the desired interval times.

At this point the test definition is complete. Click the “OK” button to close the dialog box. You will be asked if you want to save the test definition to the hard drive. Click the “Yes” button; enter the desired name and click the “Save” button to save the test.

To access parameters for specialized tests, select the Test..Edit Test Settings menu command (or use the toolbar button “Settings”) and click the Resonance, Notching or Step Test tabs.

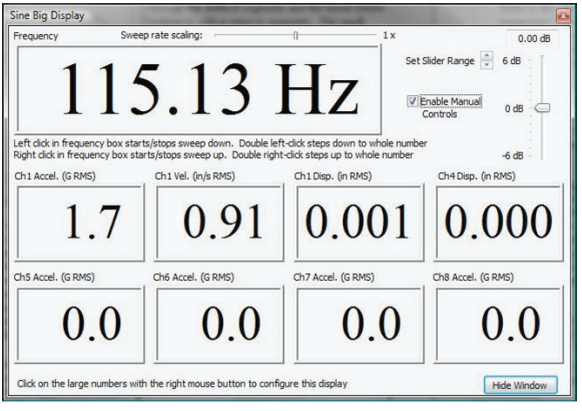
Additional Tips & Tricks for SineVIEW

To show a large display of Frequency and input readings, select View..Sine Big Display (Ctrl+B).

- Click 'Enable Manual Controls' to manually control the frequency and amplitude of the sine tone

- Left mouse click on frequency toggles sweep down. Double-click frequency steps to integer Hz values

- Right mouse click on frequency toggles sweep up. Double-click frequency steps to integer Hz values



- Mouse scroll wheel increases or decreases the dB level of the test

When defining the sweep rate in sine, you can change the sweep rate from "oct/min" to "min/sweep (Logarithmic)" to see how long one sweep will take.

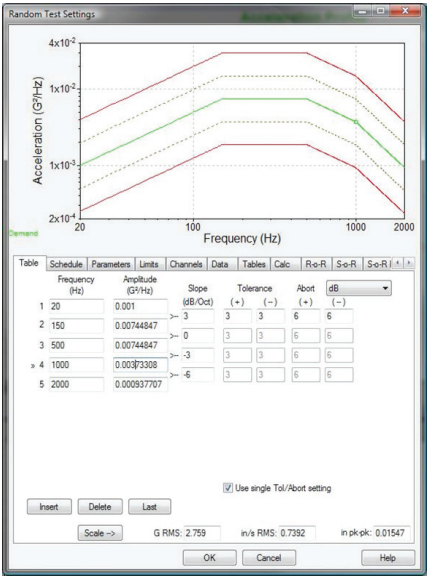
RandomVIEW Test Setup

Entering a Random Test

Click the New Test button and select "Random" to begin defining a new Random test. To disable Simple Test mode, select the Configuration..Parameters menu option and uncheck "Define new tests as Quick Tests".

This will guide you through the following series of "Advanced" configuration dialog boxes. Default values will be supplied for all parameters. If you are unsure about a parameter, use the default value (click the "Help" button in the lower right corner of the Settings window for specific Help information). After

1. Random Table - The amplitude and frequency breakpoints for the test are entered here. Use the “Insert” and “Delete” buttons to add or remove segments. The small arrow next to the numbers on the left of the window indicates the current insertion/deletion point.
2. Random Schedule - The duration and output amplitude for the test are entered here. Durations are entered in time, using the format hours:minutes:seconds.
3. Random Parameters - The feedback control parameters for the test are entered here. For most tests the parameters may be left at their default values. In some cases (such as when the control accelerometer sees a large resonance) these values will need to be tuned.



4. Random Limits - The tolerance and abort limits for the test are entered here. All limits are measured in dB relative to the demand signal. The tolerance lines are reference lines shown on the graphs (brown dashed lines) and are used to determine when to switch to “Run” mode when starting a test. When the number of lines outside the abort limits exceeds the “Max Outlier %”, the test will be aborted. The abort lines are shown on the graphs as solid red lines.

The Max System Gain and Output Threshold parameters are safety limits that depend on your particular shaker and amplifier. Refer to the “How to tune Random controller parameters” section in the manual for more information on how to tune these parameters for your system. The maximum output voltage limit is also entered here. This parameter limits the maximum output voltage produced by the controller.

5. Random Channels - The control channels are selected here, as well as averaging or extremal channel combination methods.

6. Random Data Storage - The directory into which the data from this test will be stored is selected here. Data can be automatically stored on a regular time interval, at the end of each level (levels are defined using the Schedule dialog box) and at the end of the test. Select the check boxes for your desired data storage times and enter the desired interval times.

At this point the test definition is complete. Click the “Ok” button to close the dialog box. You will be asked if you want to save the test definition to the hard drive. Click the “Yes” button; enter the desired name and click the “Save” button to save the test.

To access parameters for specialized tests, select the Test..Edit Test Settings menu command (or use the toolbar button “Settings”) and click the R-o-R, S-o-R, Notching or Import Test tabs.

Additional Tips & Tricks for RandomVIEW

To see the full spectrum outside of the control band, select Graph..Edit Graph Settings (Ctrl+G) and clear the check box for “Show Only Active Lines”.

When generating random profiles from recorded data, the high Hz content that drops off and has no significant levels can be quickly removed by selecting the last significant Hz in the table and clicking Last.

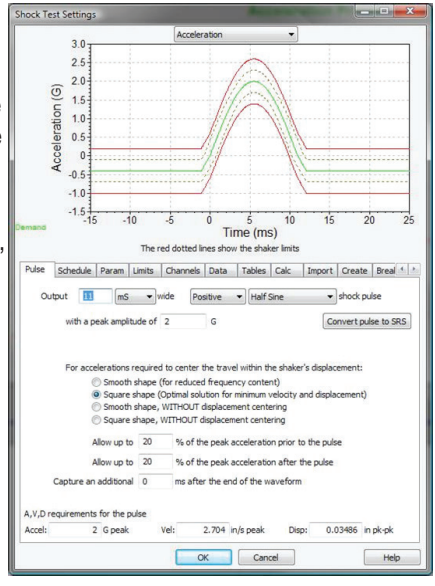
Use Microsoft Excel to help enter the Random Breakpoint table into the “Table” tab of RandomVIEW. This can be done by highlighting the frequencies and amplitudes of the breakpoint in the Excel file and right click and select “copy”. Then open the “table” tab in VibrationVIEW and right click and select “Paste Table from clipboard”. The frequencies and amplitudes are then populated in the software automatically.

ShockVIEW Test Setup

Entering a Shock Test

Click the New Test button and select “Shock” to begin defining a new Shock test. To disable Simple Test mode, select the Configuration..Parameters menu option and uncheck “Define new tests as Quick Tests”.

This will guide you through the following series of “Advanced” configuration dialog boxes. Default values will be supplied for all parameters. If you are unsure about a parameter, use the default value (click the “Help” button in the lower right corner of the Settings window for specific Help information). After all the values for each dialog tab are entered, click the next tab to advance to the next set of information for setting up the test.



1. Pulse - The desired pulse width, shape and amplitude for the test are entered here. Also, the allowable pre-pulse and post-pulse acceleration levels are entered here as a percentage of the pulse peak acceleration level.
2. Schedule - The duration of the test, in number of pulses, is entered here. The schedule also may be used to enter levels scaled to different amplitudes.
3. Parameters - The parameters that control the behavior of the control loop are entered here. The parameters generally may be left at the default settings. Refer to the “How to tune Shock controller parameters” section for more information on how to fine-tune these parameters for your system.
4. Limits - The tolerance and abort limits for the test, set as a percentage of the peak output and measured relative to the demand time waveform, are entered here. The tolerance lines are reference lines shown on the graphs (brown dashed lines) and are used to determine when to switch to “Run” mode when starting a test. The Plus and Minus aborts are limits that, when exceeded, cause the test to abort. The limits on the allowable drive voltage are also entered here.
5. Channels - Select which channel or channels you want to use as the control signal here. When selecting multiple channels, the time waveforms of the selected channels are averaged together.
6. Data Storage - The directory into which the data from the test will be stored is selected here. Data can be automatically stored at a regular pulse interval, at the end of each level (levels are defined using the Schedule dialog box) and at the end of the test. All pulses that lie outside of the defined tolerance lines can also be stored.

At this point the test definition is complete. Click the “Ok” button to close the dialog box. You will be asked if you want to save the test definition to the hard drive. Click the “Yes” button; enter the desired name and click the “Save” button to save the test.

To access parameters for specialized tests, select the Test..Edit Test Settings menu command (or use the toolbar button “Settings”) and click the Import, Breakpoints or SRS tabs.

Additional Tips & Tricks for ShockVIEW

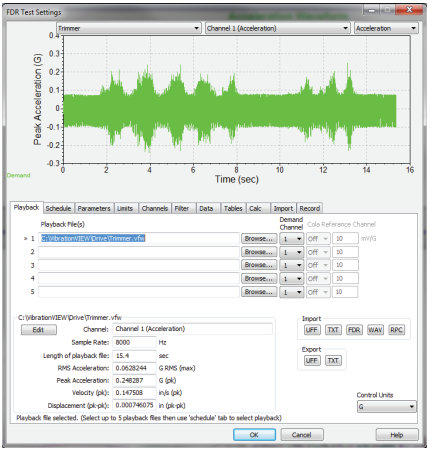
To limit shaker displacement, use the “Square Shape” setting on the Pulse tab. Also, be sure to uncheck the “Mil-STD pulse limits” on the Limits tab if MIL-STD settings aren’t required.

F.D.R.VIEW Test Setup

Entering a Field Data Replication Test

Click the New Test button and select “Field Data Replicator” to begin defining a new FDR test. To disable Simple Test mode, select the Configuration.. Parameters menu option and uncheck “Define new tests as Quick Tests”. This will guide you through the following series of “Advanced” configuration dialog boxes. Default values will be supplied for all parameters. If you are unsure about a parameter, use the default value (click the “Help” button in the lower right corner of the Settings window for specific Help information). After all the values for each dialog tab are entered, click the next tab to advance to the next set of information for setting up the test.

1. Playback - The name of the playback file, the record level and the sample rate for that file are entered here. There are also buttons for exporting and importing waveform data. For details on importing and exporting waveform data, refer to the “How to import and export Field Data Replicator waveforms” section. As an option, the playback file can also be recorded at this time, by pressing the “Record Playback File” pushbutton.



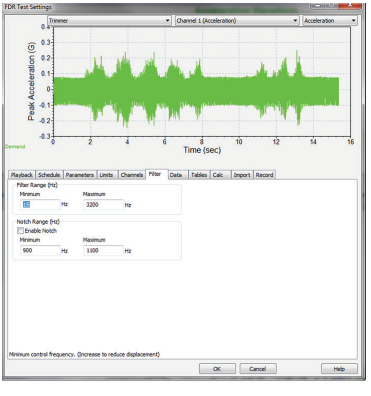
2. Record - The playback file can be optionally recorded at this time. The record option is accessible by pressing the “Record Playback File” pushbutton on the “Playback” tab. Enter the desired sample rate in the sample rate dialog, select the connected channel, and press the “Next >” button to start data-recording. Press “Next >” again to stop recording, and enter the storage data fi le name. The wizard will return to the playback tab, where the newly recorded file is now ready for playback.

3. Schedule - The time duration of the test is entered here. The test schedule also is used to schedule durations where the output signal is scaled to different amplitudes.

4. Parameters - The feedback control parameters are entered here. In most cases the default values will be sufficient. Refer to the “How to tune Field Data Replicator controller parameters” section of the manual for more information on how to tune the parameters specifically for your system.

5. Limits - The abort limits for the test are entered here. The control (Ch1) abort limit applies to the control signal, measured using the accelerometer connected to channel 1. The Output Drive limits are also entered here.

6. Filter - The frequency range over which the controller will operate is entered here. Typically one would select control from 0 Hz up to 40% of the sampling rate. If you wish to filter out low frequencies to limit the displacement requirements or filter out high frequencies to avoid shaker resonances, a smaller frequency range can be specified. You can also enable Notch Filtering here. By placing a check in the Enable Notch checkbox, you may specify a frequency range to filter out.



7. Data Storage - The directory into which the data from this test will be stored is selected here. Data can be automatically stored at a regular time interval, at the end of each level (levels are defined using the Schedule dialog box) and at the end of the test. Select the check boxes for your desired data storage times and enter the desired interval times.

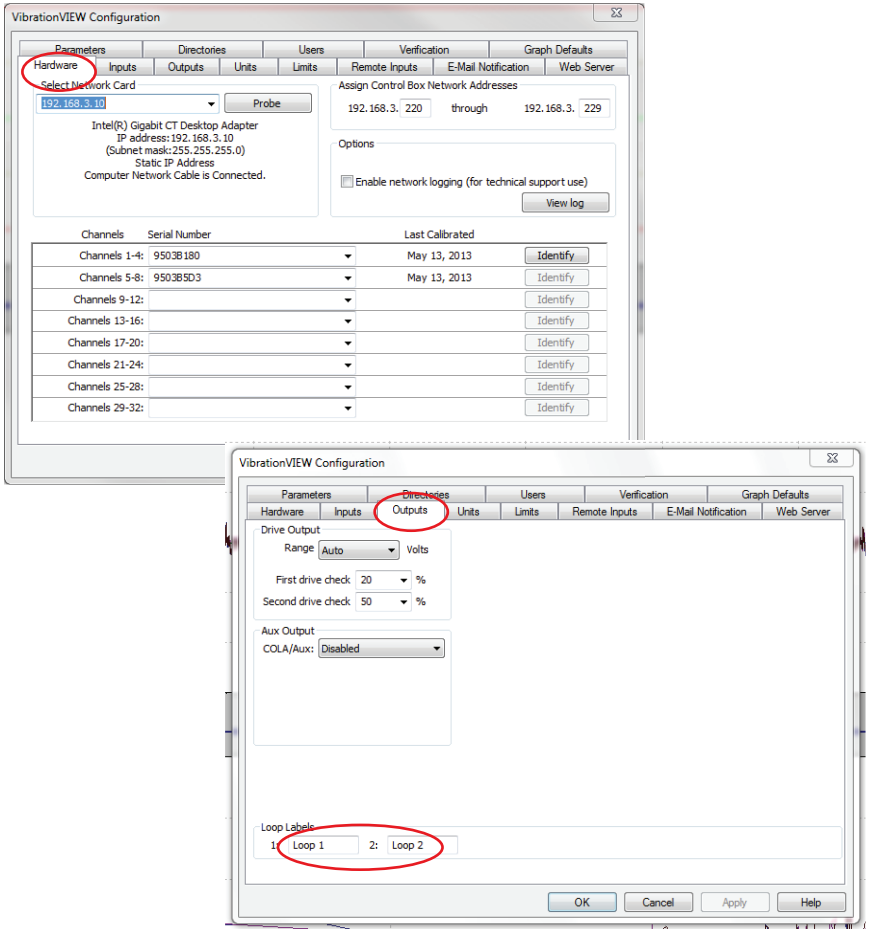
At this point the test definition is complete. Click the “Ok” button to close the dialog box. You will be asked if you want to save the test definition to the hard drive. Click the “Yes” button; enter the desired name and click the “Save” button to save the test.

Multi-Axis Test Setup

Entering a Multi-Axis Test

To set up a Multi-Axis control test you need more than one VR9500 control box. In the 'Configuration..Hardware' tab assign the appropriate VR9500's to channels 1-4 and channels 5-8 (also channels 9-12 if 3 axis testing is desired). Click on the Apply button.

In the 'Configuration...Outputs' tab, set up the loop labels. By default they are Loop 1 and Loop 2, but they can be named anything. i.e. "x axis" and "y axis."



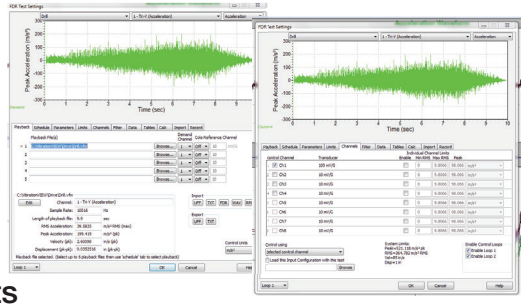
Field Data Replication Multi-Axis Tests

1. Enter the Playback file for Loop 1 and Loop 2. To set the Playback for Loop 2, change the loop you are viewing from Loop 1 to Loop 2.

2. In the “Channel’ tab, Loop 1 will have Channel 1 as default control and the default control for Loop 2 will be Channel 5. Enable Loop 1 and 2 by checking the boxes. Make the appropriate changes to control if desired.

3. In the ‘Schedule’ tab enter how long the test is to run.

4. If the recordings are of different lengths the shorter ones will repeat more often.



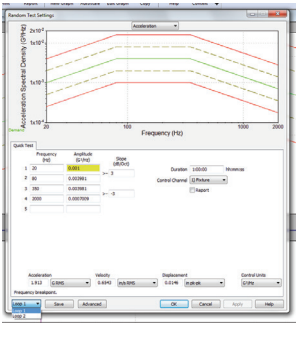
Random Multi-Axis Tests

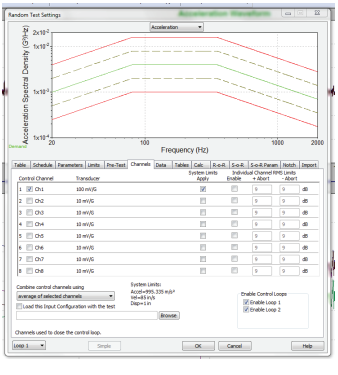
1. Enter the Breakpoint Table for Loop 1 and Loop 2 in the ‘Table’ tab.

2. In the ‘Schedule’ tab enter how long the test is to run.

3. In the ‘Channel’ tab, Loop 1 will have Channel 1 as default control and the default control for Loop 2 will be Channel 5. Make the appropriate changes to control, if desired.

4. Enable Loop 1 and 2 in the ‘Channels’ tab.





Automatic Report Generation

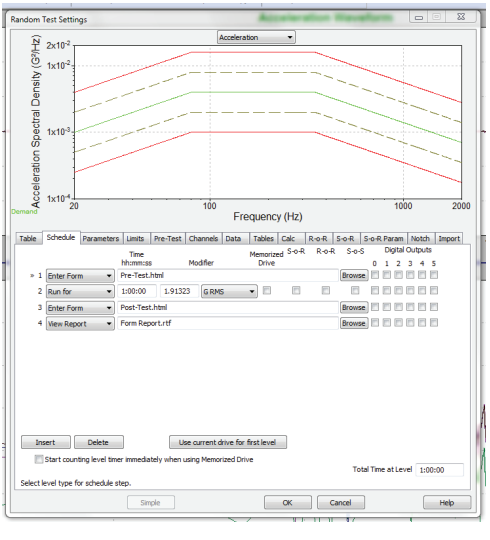
Generating a report

Reports are generated using mail merge type processing. The program reads in a template file, substitutes data values and graphs in place of keywords, and writes the resulting data to an output file. The template files can be either plain text or Rich Text Format files. Plain text files can have data values but no graphs. Rich Text Format files (using extension .rtf) can contain data values and graphs, as well as any text formatting and other graphics elements that can be inserted into an RTF file. From the VibrationVIEW software, click on the Help menu and select “Help” and click on the last item in the “How To” section, which is “Create Customized reports” to see the different keywords and examples for reporting as well as information on using Forms.

The default templates are stored in subdirectories of the directory c:\ VibrationVIEW\Templates. Sine templates are stored in the Sine subdirectory, Random templates in the Random subdirectory, etc. To create custom reports, new templates can be created using a RTF editor file and stored in the appropriate directory. One suitable RTF file editor is WordPad, a default program in Windows that is usually installed under Start..Programs.. Accessories..WordPad. If this program is not installed on your computer, it can be added by selecting it in the “Add/Remove Programs” control panel, Windows Setup tab, listed under “Accessories”. Most Windows Word-Processor programs will also read and write RTF files.

To automatically generate a report during a test, go to Settings.. Schedule and click on the “Insert” button in the lower left corner to add a step to the schedule. Use the dropdown list and select a report option (view report, save report, etc).

Another feature that can be used with automatic reporting is the Forms tool. See the Help file or Manual for more detailed information on incorporating forms into your test and customized reports.



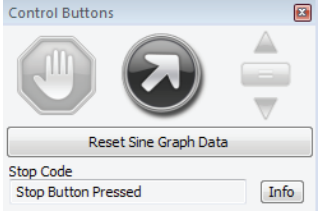
Data entry forms can be used to schedule data entry at any time during the test. Typically a data entry form is used to record test setup at the start of a test. The most recent data entry form data is accessible from the report.

The forms are html (hypertext markup language) files which typically are located in C:\VibrationVIEW\Templates\Sine\Forms, C:\VibrationVIEW\Templates\Random\Forms, C:\VibrationVIEW\Templates\Shock\Forms, or C:\VibrationVIEW\Templates\DataReplay\Forms. The html file can contain any html element which can be displayed by Internet Explorer. A typical html form file contains a single form with controls for text entry. The text can be automatically inserted into the test report. With a form the data entry can occur during test setup, and the appropriate report run at the end of the test.

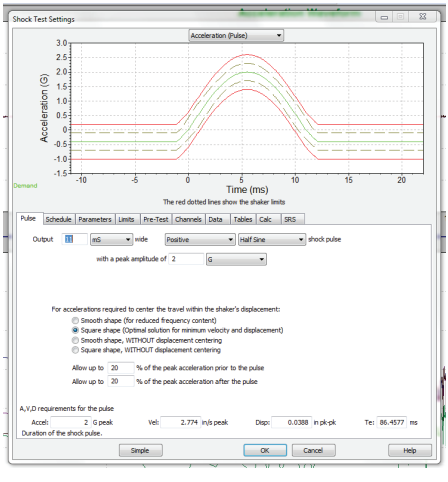
An HTML Form is a section of a document containing normal content, markup, special elements called controls (checkboxes, radio buttons, menus, etc.), and labels on those controls. Users generally “complete” a form by modifying its controls (entering text, selecting menu items, etc.), before submitting the form to VibrationVIEW for processing.

Automated Help File

The Stop Code section Info button links to the appropriate section of the Help File that explains the stop code and possible reasons for the code.



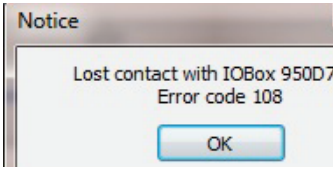
The Help button in the lower right corner of all Configuration menu windows or Settings windows link to the section of the Help File that explain each of the entries in these windows.



Troubleshooting Connection Errors

Problem #1

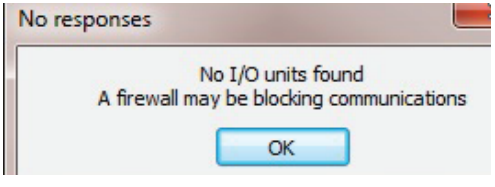
The VR I/O box is no longer communicating with the host computer.



- The Ethernet cables are not connected properly, or damaged
- The Ethernet card in the computer should show a link light
- If using a network switch, the network switch should show a link light
  A green light should be visible through the peep hole next to the Network Connector of the VR9500
- The box must be powered
- The Ethernet card in the computer is not functioning properly

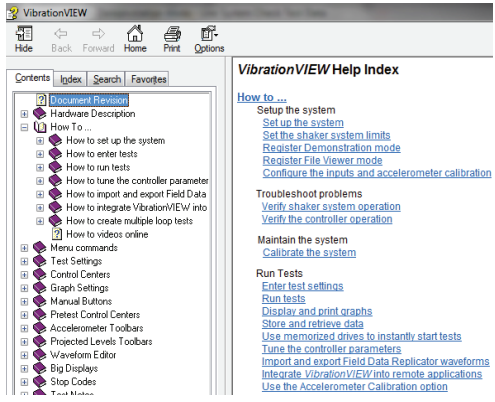
Problem #2

The VR I/O box is not returning the connection request from VibrationVIEW.



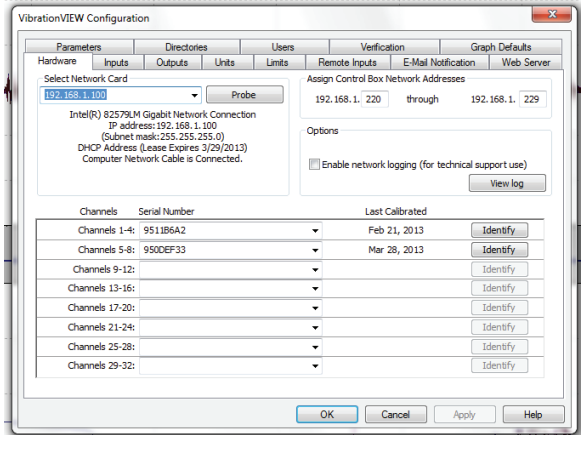
- Windows firewall may be blocking communication
- Other security software may be blocking communication (Norton, Symantec, McAfee, etc.)
- The box must be powered
- The Ethernet card in the computer and/or Ethernet Cable are not functioning properly

• Check the help file for more detail on how to set up the system. Open the help file and navigate to “How To” section.



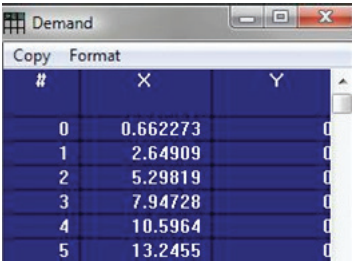
Contact Vibration Research

Before contacting VR please “Enable network logging” in “Configuration,” “Hardware” and try to reconnect. After re-connection fails click the “view log” and sent to text file to **support@vibrationresearch.com**



Tips & Tricks

Graphs



• To copy the data for a graph trace, either double click the graph trace label and select the data tab and copy, or hold down the Ctrl key and double click on the trace of data. Click “Copy” to copy the numbers to the clipboard, and then paste in another application such as Excel™.

• Zooming the graph – Right click, hold and drag the mouse to draw a zoom window. Release the mouse button to zoom into the rectangle you drew. To zoom back out, double-click the right mouse button.

• To view test detail information, Insert Graph in the Edit Graph window and choose Text Window. For example, if want to show the serial number of the 9500 unit, set one of the “graph legends” lines to [PARAM:Cal1Serial]

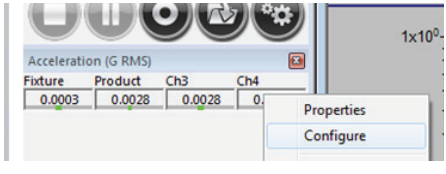
• To show a second graph of a stored data fi le, select Window..New Window to create the new graph window, and then Graph..Edit Graph Settings (Ctrl+G) to set the type of graph displayed.

• To copy the graph layout from one test to another, select Graph..Save Graph Layout to save the current layout, and then use Graph..Restore Graph Layout to restore this layout. This can also be used to view multiple graphs of a stored data file.

• For more graph and cursor options, right click on either the X or Y axis label.

Miscellaneous

• Transducers can be named by selecting Configuration..Inputs (Ctrl+I). Each channel can be given a specific name (ex. Ch1 could be “Fixture” and Ch2 could be “Product”). This is useful for reporting, as these names are carried throughout the graphs and other screen displays, and are stored in the data files.



• A quick method of getting to the Configuration of an input channel is to right click on the label in the channel display (see page 26).

• View..Reset Control Buttons restores all control buttons to a “home” position if they get “lost” when making screen resolution changes.

• Retrieve the current calibration values – Select Configuration..Calibration, then right click the Next button to bypass the calibration procedure and click Report. Use this information to compare to the results of the re-calibration.

• To quickly find recently run test profiles, select Test..Open Recent Tests, or right click the Open Test icon for a list of the last 10 tests.

• To quickly find the data for recently run tests, select Help..Help with Recent Test, or File.. Recent Data Files, or Right Click on the Data icon.

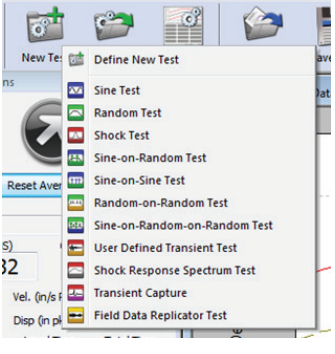
• When entering time values on the ‘Schedule’ tab, you can use shorthand “10h” for 10 hours or “5m” for 5 minutes, or combinations like “1h30m”.

• To restore a profile from a VibrationVIEW data file, use File..Open Test Profile. Set Files of type to “Extract profile from data (*.v?d)” Select the saved data file.

• Automatically save a report by inserting a step at the end of a test schedule to Save Report using the dropdown arrows. Also, be sure to choose a template from which to create the report.

• Save reporting time by using the Forms feature that is available in the test schedule drop downs. This information can then be used in the Auto Report.

• Most of the icons have quick features available by right clicking on them. For example, right clicking on the New Test icon show these options in a Random test profile.



• View..Test Tabs will show tabs at the bottom of the screen that link to recent profiles during an open session of VibrationVIEW. A test can be stopped, a new one started and stopped and then return to the originaltest to resume with the use of these Test Tabs.

• Right click on a profile name in Window's Explorer to modify a test profile while VibrationVIEW is running a test. Note: For this to work on a computer, it must have been connected to an 9500 hardware box at least once.

• Quick Reports provides for easy report generation for any test. Simply right click on Report..Setup Quick Report and select the information to be displayed in a report. Once this is done, click on the report button to generate the report automatically.

Cursors

• Hold down the Shift key while moving cursor to snap to the nearest peak.

• Hold down the Ctrl key while moving cursor to snap to the nearest valley.

• Delta Cursor – Move cursor to point 'A' on the graph and hit the Home key, Then move to point 'B' to show a delta cursor between points 'A' and 'B'.

• Press PgUP and PgDn keys to change type of delta cursor measurement.

• Press the Insert key to add a cursor measurement as a graph annotation.

• Double-click on a graph annotation to change the text to any message you want to add to the graph.

Recorder

• To view the recorder buttons, select View..Recorder Buttons.

• To edit the directory for the recording, sample rate, and channels to record, left click on the above icon.

Quick Tip Videos

• View Quick-Tip videos on our website at http://www.vibrationresearch.com/open_video/quicktips.html, or follow the QR code on the right.

Archived Webinar Videos

• View archived webinars on our website at http://www.vibrationresearch.com/training_video/Webinar/video_gallery.html, or follow the QR code on the right.

Hardware Description

VR9500 Front & Back Panel Port Description

The VR9500 uses a 100/1000BASE-T port on the rear panel for connecting to a network. The Gigabit Ethernet port can operate at 100 or 1000 Mbps. The port supports auto-negotiation, full duplex, and flow control. The port also supports Auto-MDX operation to eliminate any requirements for crossover network cables.

The Front Panel has four BNC input connectors which support various analog input devices. Each port includes support for 1 Volt Peak, 10 Volt Peak, and 20Volt Peak input ranges. Each port supports Single Ended, Differential, and Capacitor coupled operation. Each port supports IEPE transducers and smart transducers (TEDS).

The Rear Panel has two BNC output connectors which support various analog drive devices. The DRIVE port is typically used to drive an amplifier or servo-hydraulic controller. The AUX port is typically used to support synchronization with COLA (constant level adapter) devices such as stroboscopes or data acquisition devices. It can also provide a second amplifier output to support differential mode outputs, or multiple axis devices.

The Rear Panel has an Aux Inputs/Outputs male DB37 connector to allow control of additional devices. The data acquisition devices include TTL status signals from amplifiers.

System Ventilation Fan

The VR9500 controller has one fan for system ventilation.

Installing the Controller

A NOTE indicates important information that helps you make better use of your controller.

A CAUTION indicates a potential for property damage, personal injury, or death.

Installation Precautions

CAUTION: Before performing any of the following procedures, read and follow the safety instructions.
CAUTION: If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
CAUTION: Observe the following points before performing the procedures in this section:

- Ensure that the rack or cabinet housing the device is adequately secured to prevent it from becoming unstable and/or falling over.
- Ensure that the power source circuits are properly grounded.
- Observe and follow the service markings. Do not service any device except as explained in the system documentation. Opening or removing covers marked with a triangular symbol with a lightning bolt may cause electrical shock. These components are to be serviced by trained service technicians only.
- Ensure that the power cable, extension cable, and/or plug is not damaged.
- Ensure that the device is not exposed to water.
- Ensure that the device is not exposed to radiators and/or heat sources.
- Ensure that the cooling vents are not blocked.
- Do not push foreign objects into the device, as it may cause a fire or electric shock.
- Use the device only with approved equipment.
- Allow the device to cool before removing covers or touching internal equipment.
- Ensure that the device does not overload the power circuits, wiring, and over-current protection. To determine the possibility of overloading the supply circuits, add together the ampere ratings of all switches installed on the same circuit as the device. Compare this total with the rating limit for the circuit.
- Do not install the device in an environment where the operating ambient temperature might exceed 50ºC (122ºF).
- Ensure that the airflow around the front, sides, and back of the device is not restricted.

Site Requirements

The VR9500 can be mounted in a standard equipment rack or placed on a tabletop, or mounted on the wall.
Before installing the device, verify that the site selected for the device meets the following site requirements:

• Power — The device is installed within 1.5 m (5 feet) of a grounded, easily accessible outlet 220/110 VAC, 50/60 Hz.
• General — Ensure that the power supply is correctly installed.
• Clearance — There is adequate frontal clearance for operator access. Allow clearance for cabling, power connections, and ventilation.
• Cabling — Cabling is routed to avoid sources of electrical noise such as radio transmitters, broadcast amplifiers, power lines, and fluorescent lighting fixtures.
• Ambient Requirements — The ambient device operating temperature range is 0 to 50 °C (32 to 122 °F) at a relative humidity of up to 95%RH , non-condensing. Verify that water or moisture cannot enter the device case.
• Do not operate this product near volatile or flammable materials.

Unpacking

While unpacking the device, ensure that the following items are included:
• The device
• AC power cable
• Rack-mount kit for installation
• Software CD

Installing on a Flat Surface

The device must be installed on a flat surface if it is not installed on a rack. The surface must be able to support the weight of the device and the device cables.

1. Set the device on a flat surface, while leaving 2 inches (5.08 cm) on each side and 5 inches (12.7 cm) at the back.
2. Ensure that the device has proper ventilation.

Other Installation Methods

CAUTION: Always mount controller horizontally
The controller requires ventilation as provided by nominal horizontal orientation and mounting in other orientations is not recommended.

Connecting the Device to a Power Supply

CAUTION: This product must be reliably earthed and installed in accordance with the prevailing electrical wiring regulations and the safety standards.

1. Connect the supplied standard AC power cable to the AC connector on the back panel

2. Connect the power cable to a grounded AC outlet. When used in a control system all the grounds must be common. This is most easily accomplished by connecting the power cable to the outlet provided in the amplifier for a controller. The power source can be 90-250VAC and 50 or 60 Hertz. No operator settings are required for voltage configuration.
3. After connecting the device to a power source, confirm that the device is connected and operating correctly by examining the LEDs on the front panel.

Connecting the Device to an Amplifier

CAUTION: Always connect the power cable to a grounded AC outlet prior to connecting or disconnecting the drive cable.

Connect the supplied (or an alternative equivalent) 50 Ohm BNC cable between the DRIVE output and the DRIVE input on the amplifier.

Connecting the Device to the Accelerometer

CAUTION: Always connect the power cable to a grounded AC outlet prior to connecting or disconnecting the drive cable.
CAUTION: Always verify the mounting surface of the accelerometer is floating or grounded.
CAUTION: Terminals provided on the unit shall be connected only to passive load transducers or source transducers that apply no more than 10V to the circuit that originates from the Medallion II (or other value that equates to not more than 33Vac rms /46.7V peak or 70Vdc total on the circuit)
CAUTION: Other than the IEC inlet for input power to the unit, terminals provided on the rear of the unit shall be connected only to SELV / double insulated circuits of other equipment.
CAUTION: If any sourcing transducers (accelerometer) add voltage to the existing voltage originating from the Medallion II , the total shall not exceed the 70Vdc or 33 Vac(rms).

Connect the accelerometer to the front panel input.

Connecting the Device to the Network

To connect to an uplink port, use Category 5 Unshielded Twisted-Pair (UTP) cables with RJ-45 connectors at both ends. The RJ-45 ports on the Ethernet device support automatic Media-Dependent Interface/Media-Dependent Interface with internal crossover wiring (MDI/MDIX) operation under Auto-Negotiation mode.

Standard straight-through twisted-pair cables can be used to connect to any other Ethernet network (systems, servers, switches or routers) that supports auto-negotiation.
NOTE: Do not plug a phone jack connector into an RJ-45 port. This will damage the Ethernet device. Use only twisted-pair cables with RJ-45 connectors that conform to FCC standards.

To connect the device to the network:
1. Attach one end of a Twisted-Pair cable to the device's RJ-45 connector and the other end to a switch or workstation computer.
2. Make sure the twisted pair cable does not exceed 328 feet. (100 meters) in length.

As the connection is made, the network LED is illuminated indicating that the connection is valid.

Cables, Port Connectors & Pinout Information

Front Panel LEDs

Power LED
On the VR9500 front panel there is a Power LED. The following table describes the Power Supply status LED indications.

LED Color	Description
Green Solid	The switch is turned on.
Off	The switch is not turned on.

Network LED
On the VR9500 front panel there is a Network LED. The following table describes the Network status LED indications.

LED Color	Description
Off	
Green Solid	The network port is linked.
Green Flashing	The nework port is transmitting or reciving data.
Red Solid	The network port is not linked (cable disconnected or faulty).

Status LED

On the VR9500 front panel there is a Status LED. The following table describes the Status LED indications.

LED Color	Description
Off	Controller is faulted.
Green Solid	Controller is faulted.
Green Flashing	Controller operating normally.
Red Solid	Red when starting, if maintained controller is faulted.
Amber Solid	Amber when starting, if maintained controller is faulted.
Amber Flashing	Controller is not connected to Medallion Software.

Fault LED

On the VR9500 front panel there is a Fault LED. The following table describes the Fault LED indications.

LED Color	Description
Off	No faults.
Red Solid	Fault detected.
Red Flashing	Fault detected.

Channel LED

On the VR9500 front panel there is a channel LED around each of the four input channels. The following table describes the channel LED indications. The channel LEDs provide connection status of IEPE (Integrated Electronics Piezo Electric) accelerometers such as those sold under the ICP (Integrated circuit-piezo electric) and Isotron trade names.

LED Color	Description
Off	IEPE turned off.
Green Solid	IEPE enabled, and accelerometer connected.
Red Solid	IEPE enabled, and input fault, shorted or open.
Amber Solid	IEPE enabled, and input bias voltage is marginal.

Rear Panel LEDs

LED	Color	Description
Right LED	Green Solid	Link active.
	Green Flashing	Link active and network activity.
Left LED	Amber Solid	1000BT link active.
	Off	100BT link active and network activity.

1000BASE-T Cable Requirements

All Category 5 UTP cables that are used for 100BASE-TX connections also operate with 1000BASE-T, provided if all four wire pairs are connected. However, it is recommended that enhanced Category 5 (Category 5e) cable is used for all critical connections or any new cable installations. The Category 5e specification includes test parameters that are only recommendations for Category 5, and comply with the IEEE 802.3ab standards. The device supports auto-detection of straight through and crossed cables on all switching 10/100/1000BaseT ports. The automatic correction of errors in cable selection makes the distinction between a straight through cable and a crossover cable irrelevant. (The standard wiring for end stations is known as MDI (Media Dependent Interface), and the standard wiring for hubs and switches is known as MDIX.)

RJ-45 Connections fo 10/100/1000BASE-T Ports

The 10/100/1000BASE-T ports are copper Twisted-Pair ports.

CAUTION: Terminals provided on the unit shall be connected only to passive load transducers or source transducers that apply no more than 10V to the circuit that originates from the VR9500 (or other value that equates to not more than 33Vac rms /46.7V peak or 70Vdc total on the circuit)

CAUTION: Other than the IEC inlet for input power to the unit, terminals provided on the rear of the unit shall be connected only to SELV / double insulated circuits of other equipment.

BNC Inputs & Outputs

BNC connectors are manufactured with 50 and 75 ohm impedance capability. 50 Ohm cables are typically used in this application. BNC Inputs are typically used with accelerometer. Nominal ranging allows for maximum 20 Volts peak input devices. BNC output ranging allows driving maximum 10V peak devices.

DB37 Aux Inputs/Outputs

Mating connector is an Amphenol L777-RR-C-37-P (or equivalent). Inputs are 10VPeak inputs, with provision to read nominal TTL signals. Outputs are Nominal TTL voltage levels and require external conditioning to drive high voltage and high current devices.

Power Connectors

The VR9500 is powered by using the AC internal power supply.

Internal Power Supply Connector

The VR9500 supports a single internal power supply to provide power for switching operations. The internal power supply supports input voltages between 90 and 250 VAC. The AC power connector is located on the back panel of the controller.

Physical Dimensions

The VR9500 controller has the following physical dimensions:

- Height — 1.75” (44.45mm) (1U)
- Width — 15” (381mm) (19” rack mount with included brackets)
- Depth — 9.5” (242 mm)

Maintenance

CAUTION: Remove power from the VR9500 prior to cleaning near the ventilation slots.

You should not have to carry out much preventative maintenance on the VR9500. An annual verification of the calibration is recommended to ensure the accuracy of the controller. At the time of the annual calibration debris should be blown out of the ventilation slots and the fan. Verify the operation of the fan, and make sure ventilation (as defined in the installing the controller instruction) is maintained.

The functionality of the fan should be checked monthly, and cleaned as required in a high dirt and dust environment.

Use one of the following items to clean a VR9500 enclosure:
- A soft, dry cloth
- A soft cloth moistened with water
- A soft cloth moistened with a solution of water and a gentle, non-scratch household cleaner that does not contain ammonia

CAUTION: Never use a fuse with a higher current rating, lower voltage rating, or slower time delay than the specified fuse. Replace fuse with same type and rating as fitted.

The VR9500 is protected by a fuse in-between the power cord and the power switch. The power cord must be removed to replace the fuse. Replace the main fuse with the same type (usually a LittleFuse 0218002. HXP) to maintain protection against overheating, damaging the controller, and possible fire.

High Voltage Warning

CAUTION: Dangerous voltages are present within the power supply. Disconnect power supply before servicing.

• All servicing, repair, and testing of these products must be carried out by competent personnel who are conversant with the particular hazards of AC line operated equipment, and with the particular dangers of switch mode power supplies.
• After disconnecting the AC source, allow 5 minutes before touching the unit to allow capacitors within the unit to discharge.
• Heatsinks within this product may be live. Test before touching.
• This product must be reliably earthed and professionally installed in accordance with the prevailing electrical wiring regulations and the safety standards.
• The internal power supply uses a 3.15A FAST ACTING 250V LBC FUSE 5 x 20mm (F1). This fuse is accessible only to qualified service personnel. IMPORTANT: REPLACE FUSE WITH SAME TYPE AND RATING AS THAT FITTED.

Key Mapping

Function Key Mapping

F1	Display help for the current window
F2	Show the Control buttons
F3	Show the Channel buttons
F4	Move the selected annotation
F5	Refresh graph
F7 or Del	Remove the selected annotation
F8	Start Test Sequence
F9	Run Test
F10	Stop Test
F11	Advance immediately to next level
F12	Print the screen image to the printer
Shift+Ins	Add annotation at nearest peak
Ctrl+Ins	Add annotation at nearest valley
Ins	Add an annotation to the graph
“-->”	View next data file in directory
“<--”	View previous data file in directory
Alt+PrtSc	Copy the screen image to the clipboard to be pasted into Paint or Word.

Key Mapping

Control Key Mapping

Ctrl +	
“A”	Autoscale the Y Axis
“B”	Show the Sine Big Display window
“C”	Copy the selected graph to the clipboard
“D”	Show the cursor display
“E”	Change the eMail configuration
“F”	Zoom out to fit the data
“G”	Change the selected graph settings
“I”	Change the input configuration
“M”	Save the current output to Memorized Drive
“N”	Create a new graph
“O”	Open a stored data file
“P”	Freeze/Unfreeze the graph updates
“Q”	Autoscale all open graphs
“R”	Generate a report
“S”	Save the data to a file
“T”	Inserts Time/Date stamp in *Test Notes*
“V”	Paste text from the clipboard
“W”	Identify the primary controller box
“X”	Copy text to the clipboard
“Y”	Show the COLA configuration window

	Sine	Random	Shock	FDR
	Test is stopped			
	Test is running			
	Starting test			
	Holding frequency with phase tracking of the resonance	Starting test using Memorized Drive		
	Holding fixed frequency			
	Test paused / Waiting for operator action			

Notes